MT3114B

N-Channel 100V/120A Power MOSFET

MT Semiconductor®

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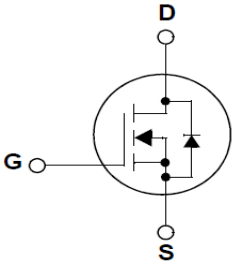
Features

- Typ R_{DS}(on)=6.8mΩ / V_{GS}=10V,I_D=60A
- Fast Switching Speed
- Low Gate Charge
- 100% avalanche tested

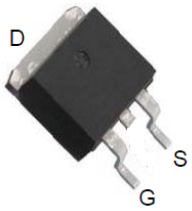
Simplified Schematic



General Description

This N-Channel MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low R_{DS}(ON) and fast switching speed.

MARKING DIAGRAM & PIN ASSIGNMENT



Applications

- DC-DC primary bridge
- DC-DC Synchronous rectification
- Power Managemement for Inverter Systems

Package Code

MT3114B: TO-263-2L

Date Code: PYWWM

Lot No: XX

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		100	V
V_{GSS}	Gate-Source Voltage		±25	
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		-55 to 175	°C
I_S	Diode Continuous Forward Current	T_C=25°C	120	A

Mounted on Large Heat Sink

I_{DM}	Pulsed Drain Current *	T_C=25°C	480**	A
I_D	Continuous Drain Current	T_C=25°C	120	A
		T_C=100°C	84	
P_D	Maximum Power Dissipation	T_C=25°C	237	W
		T_C=100°C	119	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		0.63	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		62.5	
Avalanche Ratings				
E_{AS}	Avalanche Energy, Single Pulsed	L=0.5mH	756***	mJ

Note：* Repetitive rating ; pulse width limiited by junction temperature
** Drain current is limited by junction temperature
*** VD=80V

Electrical Characteristics (T_C = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	100	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=100V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	10	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	2.0	3.0	4.0	V
I_{GSS}	Gate Leakage Current	V_{GS}=±25V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$*	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=60A	-	6.8	8.5	mΩ
Diode Characteristics						
V_{SD}*	Diode Forward Voltage	I_{SD}=60A, V_{GS}=0V	-	0.8	1	V
t_{rr}	Reverse Recovery Time	I_{SD}=60A, dI_{SD}/dt=100A/μs	-	46	-	ns
Q_{rr}	Reverse Recovery Charge		-	98	-	nC

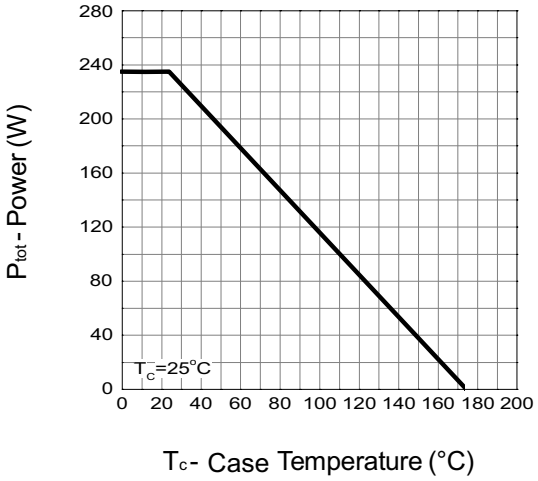
Electrical Characteristics (Cont.) (T_C = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Dynamic Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	1.7	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, Frequency=1.0MHz	-	4922	-	pF
C_{oss}	Output Capacitance		-	902	-	
C_{rss}	Reverse Transfer Capacitance		-	508	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=50V, R_G= 6 Ω, I_{DS} =60A, V_{GS}=10V,	-	23	-	ns
T_r	Turn-on Rise Time		-	35	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	77	-	
T_f	Turn-off Fall Time		-	44	-	
Gate Charge Characteristics						
Q_g	Total Gate Charge	V_{DS}=80V, V_{GS}=10V, I_{DS}=60A	-	120	-	nC
Q_{gs}	Gate-Source Charge		-	17	-	
Q_{gd}	Gate-Drain Charge		-	28	-	

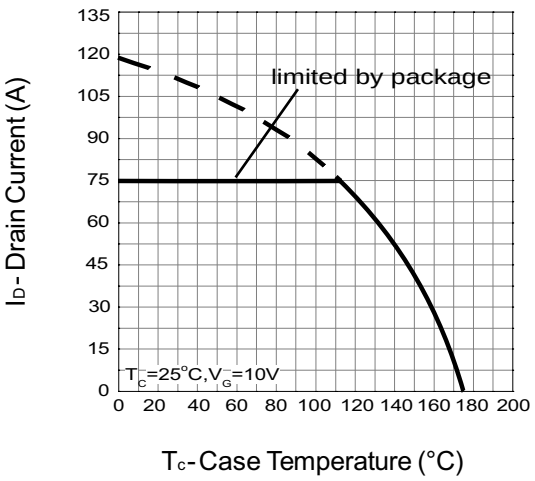
Note * : Pulse test ; pulse width ≤300μs, duty cycle≤2%.

Typical Operating Characteristics

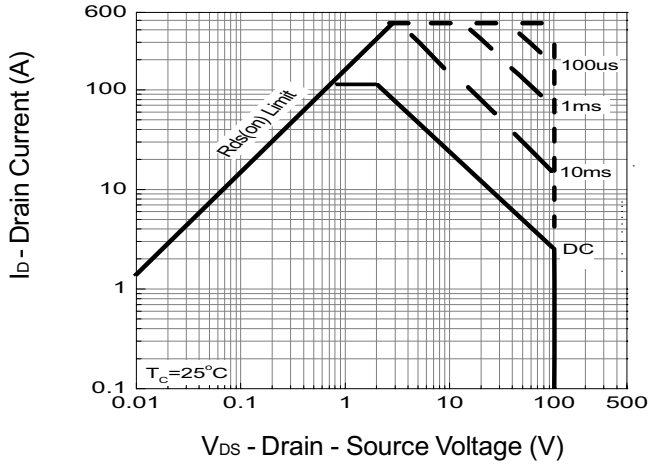
Power Dissipation



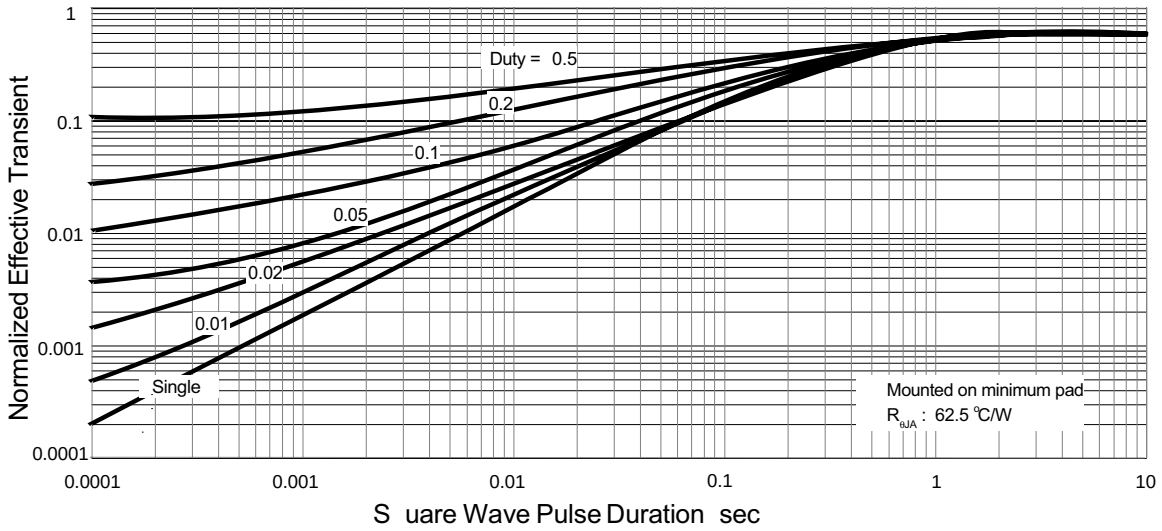
Drain Current



Safe Operation Area

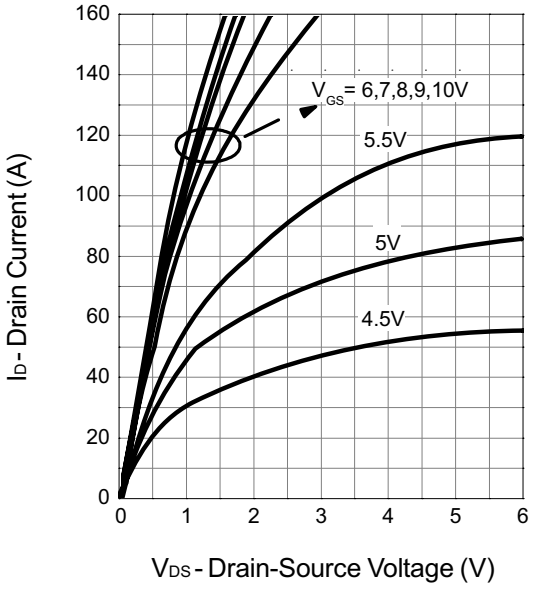


Thermal Transient Impedance

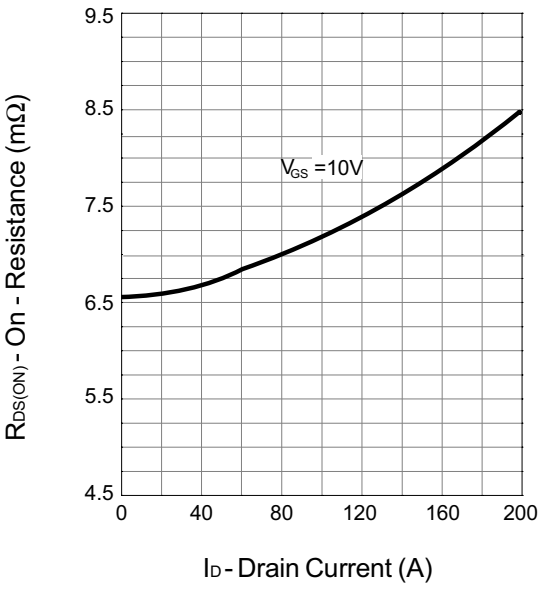


Typical Operating Characteristics (Cont.)

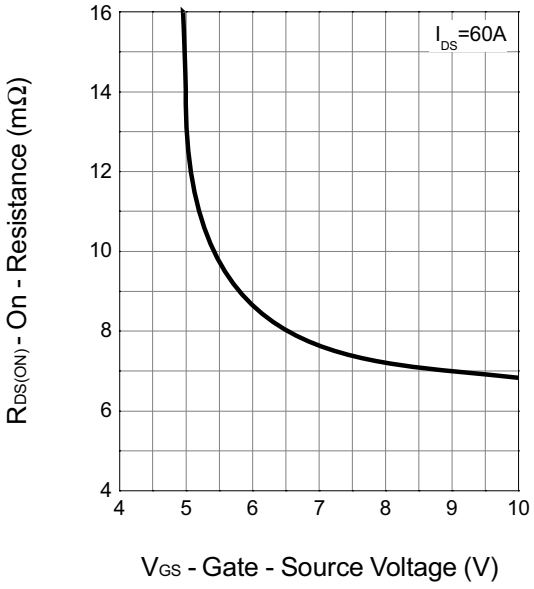
Output Characteristics



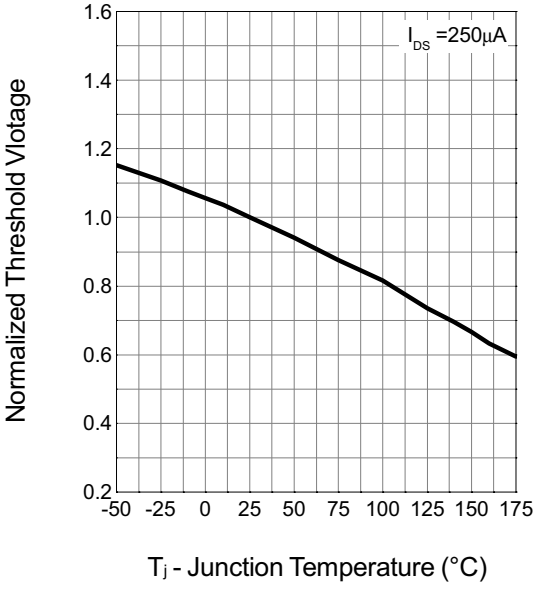
Drain-Source On Resistance



Drain-Source On Resistance

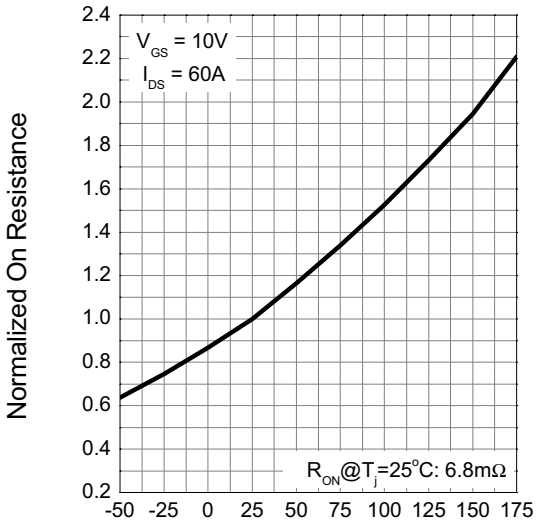


Gate Threshold Voltage

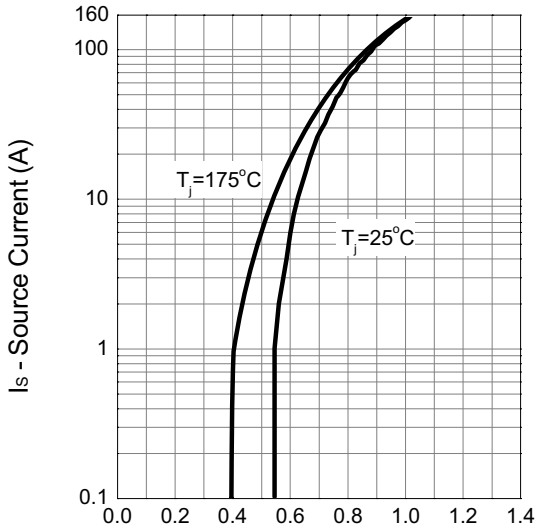


Typical Operating Characteristics (Cont.)

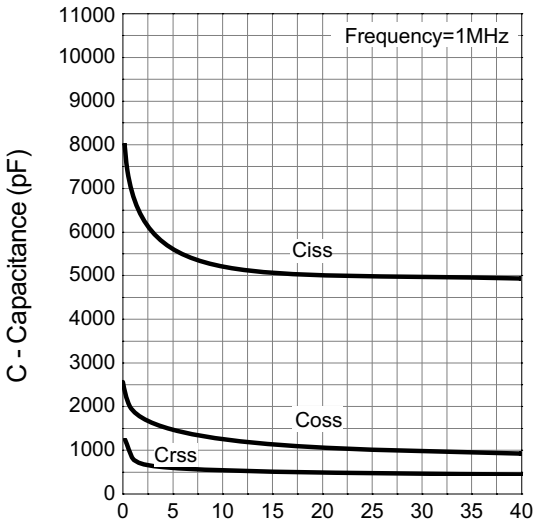
Drain-Source On Resistance



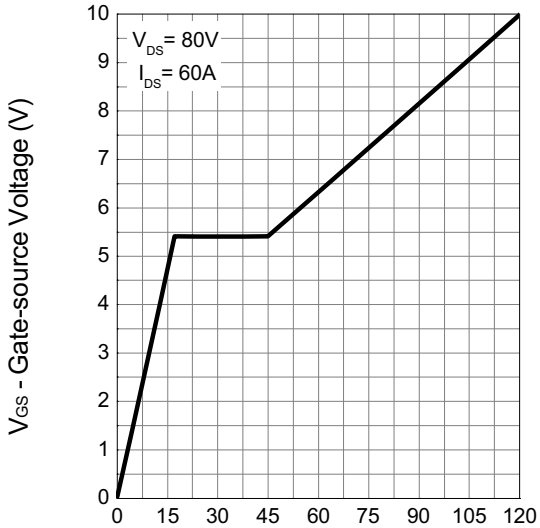
Source-Drain Diode Forward



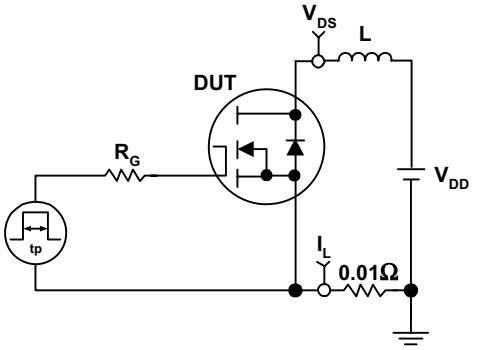
Capacitance

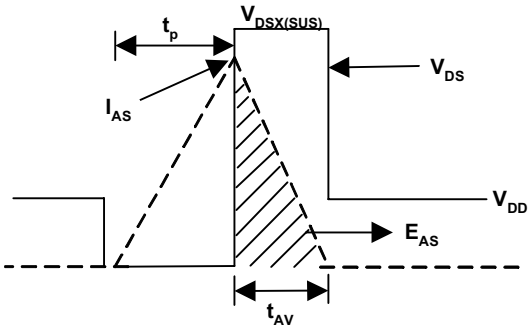


Gate Charge

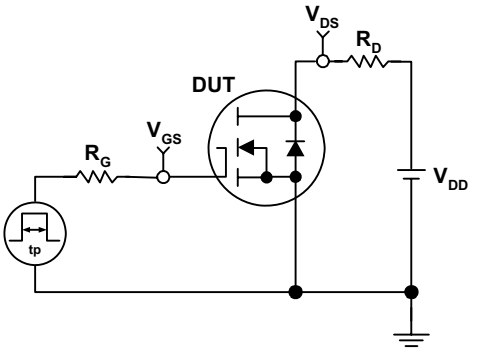


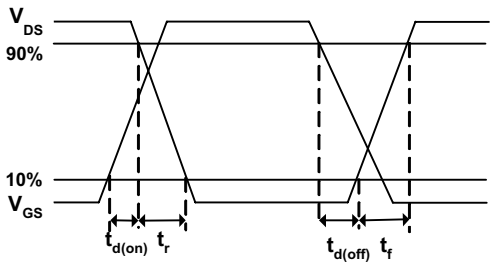
Avalanche Test Circuit and Waveforms





Avalanche Test Circuit and Waveforms





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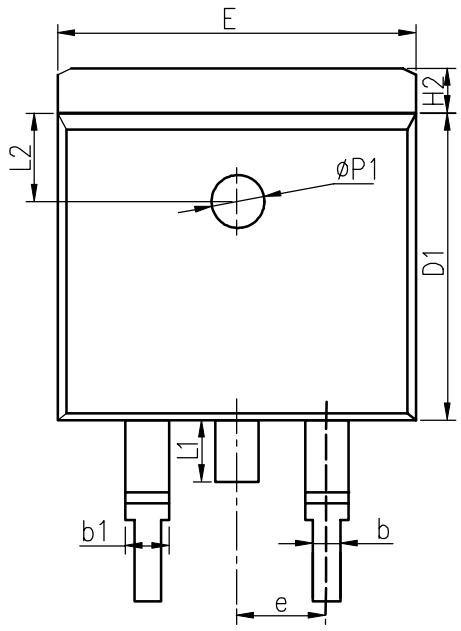

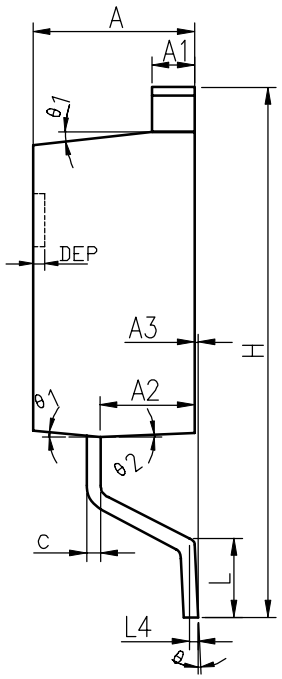

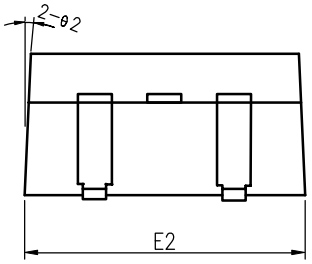

COMMON DIMENSIONS

SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185
A1	1.22	1.27	1.32	0.048	0.050	0.052
A2	2.59	2.69	2.79	0.102	0.106	0.110
A3	0.00	0.10	0.20	0.000	0.004	0.008
b	0.77	0.813	0.90	0.030	0.032	0.035
b1	1.20	1.270	1.36	0.047	0.050	0.054
c	0.34	0.381	0.47	0.013	0.015	0.019
D1	8.60	8.70	8.80	0.339	0.343	0.346
E	10.00	10.16	10.26	0.394	0.400	0.404
E2	10.00	10.10	10.20	0.394	0.398	0.402
e	2.54 BSC			0.100 BSC		
H	14.70	15.10	15.50	0.579	0.594	0.610
H2	1.17	1.27	1.40	0.046	0.050	0.055
L	2.00	2.30	2.60	0.079	0.091	0.102
L1	1.45	1.55	1.70	0.057	0.061	0.067
L2	2.50 REF			0.098 REF		
L4	0.25 BSC			0.010 BSC		
	0°	5°	8°	0°	5°	8°
1	5°	7°	9°	5°	7°	9°
2	1°	3°	5°	1°	3°	5°
ΦP1	1.40	1.50	1.60	0.055	0.059	0.063
DEP	0.05	0.10	0.20	0.002	0.004	0.008

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